

Title: Possibilities of using void to improve natural cross ventilation in high-rise low- cost residential building (HRLCRB)

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Abstract:

This thesis focuses on the study to investigate the possibilities of improving natural cross ventilation (in term of internal air velocity, m/s) in high-rise low-cost residential building (HRLCRB) in Kuala Lumpur. The HRLCRB design is found complied with the minimum requirement of natural ventilation in the Uniform Building Bye-Law (VBBL) and has architectural design that could permit optimum natural ventilation. However, the natural ventilation and thermal comfort performance is still not achieved with respect to its internal air velocity performance. Cross ventilation has been suggested by many researchers as one of the most effective techniques of natural ventilation for thermal comfort. However, it is also one of the least understood parts in controlling indoor climate through passive design approach. In this thesis the proposed design solution is by introducing a void at specific floor level or height ratio of the HRLCRB. The research involves three stages. First, the inventory exercises. This is to determine the most basic and typical typology of HRLCRB built by Dewan Bandaraya Kuala Lumpur (DBKL). Second, computer simulation using Computational Fluid Dynamic (CFD) technique with specific software called FloVent. This software is used to estimate the vertical pressure distribution and to investigate the potential of the proposed design solution. Finally, empirical method is used to predict the internal air velocity. The result of the simplified building configuration is used as a basis of comparison. The result shows that the void affects the vertical pressure distribution. However, the effect is insignificant to improve the internal air velocity performance at the HRLCRB.